LIVER REGENERATION

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Key words: *liver, review, regeneration, stem cells, hepatocytes*

Background. Liver transplantation remains the only option for treating liver failure but is only available for a small number of patients. Alternative methods of treatment can expand the number of patients receiving effective treatment.

Aim. To study the features of the process of liver regeneration.

Material and Methods. The articles for the period from 2012 to 2017 were analyzed. The search was performed in the databases PubMed, Embase, Scopus. The words used are «liver regeneration», «stem cell–derived hepatocytes», «and engineered liver».

Results and Discussion. Tumor necrosis factor (TNFα), interleukin-6 (IL-6), hepatocyte growth factor (HGF) cause hepatocytes to pass from G0 to the S-phase of the cell cycle. Chronic liver damage causes a canal reaction in which liver progenitor cells (LPC) participate. Normally LPC show the ability of bipotential differentiation to both hepatocytes and cholangiocytes. Cell therapy by repopulation with transplanted hepatocytes is a safe and effective method, but only leads to a short-term partial correction of metabolic disorders, it is necessary to optimize engraftment and spreading. Liver diseases at the final stage are incompatible with cellular therapy due to the lack of a suitable environment for cell engraftment and repopulation. It is important to prove that the bioengineering liver is clinically safe, the network of the vasculature is not damaged to provide functional vascularization.

Conclusions. Replication of hepatocytes is dependent on the effect of growth factors and cytokines — TGF-α, HGF and IL-6, LPC can differentiate to both hepatocytes and cholangiocytes, the best solution is the use of induced pluripotent stem cells.

THE RESULT OF EARLY DIAGNOSIS OF CARPAL SYNDROME IN DENTISTS

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Key words: *carpal syndrome, dentistry, injection, local anesthesia*

Aim. To conduct an ultrasound diagnosis of carpal syndrome in dentists.

Material and Methods. The study involved 300 dentists aged 25–65 years, divided into 4 groups according to age: group 1 — 25–35; 2 — 36–45 years; 3 — 46–55 years; 4 — 56–65 years. All doctors underwent a diagnostic test of Falen, in which flexion (or extension) of the hand by 90 degrees results in numbness, tingling sensation or pain in less than 60 sec. A healthy person can also develop similar feelings, but not earlier than 1 minute later. The criterion for exclusion was the presence of diseases of the peripheral nervous system, trauma to the working hand.

Results and Discussion. Of the study showed a positive Falen test in seconds: 1st group for 73±0.9; in the 2nd group 69±0.5; in the 3rd group 64±0.4; in the 4th group 58±0.3. There was also a tendency to form a carpal syndrome in doctors who have reached the age of 50.

Conclusions. The results showed the direct dependence of the appearance of clinical symptoms of carpal syndrome of the canal by age, as well as the need for a more applied introduction to the educational process of the principles of ergonomics in dentistry.

ANATOMOMETRIC CHANGES OF THORAX AND SPINE AFTER PNEUMONECTOMY

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Key words: *pneumonectomy, thorax, spine, computed tomography, postoperative changes*

Aim. Identification of topographic-anatomical changes of thorax and spine after pneumonectomy

Material and Methods. An analysis of computed tomograms of 32 patients (29 men and 3 women aged 39 to 68 years) to pneumonectomy for lung cancer and 12 months after the operation was carried out. From 32 pneumonectomies 15 were performed on the right, 17 — on the left. The postoperative period passed without complications, leading of the post-pneumonectomy cavity was passive. The investigations were performed on a multispiral tomograph. On axial scans the retraction of the thoracic wall, anteroposterior and transverse dimensions of the thorax of the operated side were evaluated. In the mode of multiplanar reconstruction, the angle of inclination of lateral segments of the III and VII ribs was studied. The kyphotic and scoliotic deformation in the spinal were assessed by the Chaklin method. For statistical evaluation, Statistica 10.0 were used.

Results and Discussion. The obtained data showed that over one year after pneumonectomy

in the chest on the side of the operation, the anteroposterior size decreased by 19.8±2.6 mm and transverse by 10.8±2.6 mm. The degree of decrease in anteroposterior direction is more pronounced, that leads retraction of the thoracic wall by 19.8±3.7 mm.

The deformation of the chest occurs due to a decrease in the angles of the inclination of the ribs: the III rib by 5.6±1.7, the VII rib by 3.9±1.1. Deformity of the spine consists in significant scoliotic changes, after pneumonectomy on the right on 3.1±2.5, after pneumonectomy on the left on 5.8±4.2. Kifotic changes of the spine are minimal (1.7±1.8).

Conclusions. Performing of pneumonectomy leads to significant changes in the thorax: deformity of the chest on the operated side and scoliosis of the spine.

BREAST CANCER BRAIN METASTASIZATION: COMPARISON OF HIPPOCAMPAL AND CEREBELLAR PATTERNS

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Key words: *brain regions, epithelial-mesenchymal transition, myosin light chain kinase, platelet-derived growth factor-B, signaling, transendothelial migration*

Aim. To decipher key aspects of breast cancer (BC) brain metastasization related with blood-brain barrier (BBB) transposition by malignant cells, their phenotype, and migratory and proliferative features, as well as to establish the regional pattern of the brain metastatic process.

Material and Methods. Hippocampal and cerebellar sections of mice inoculated with BC cells (BCCs) were studied along metastasization (5 hours, 3, 7, and 10 days) by histologic/immunohistochemical/immunofluorescence analysis.

Results and Discussion. Brain metastases were detected from 7 days onwards, with greater tumour area observed in the hippocampus. Accordingly, a higher number of cells expressing the proliferation marker Ki-67 and platelet-derived growth factor-B was observed in the hippocampus. Malignant cells entering in the parenchyma expressed the mesenchymal marker vimentin, whereas in metastasis the epithelial marker pan Cytokeratin was observed as well, particularly in the hippocampus. Moreover, an earlier expression of Rac 1 was observed in the hippocampus, compatible with mesenchymal-like migration. The brain metastatic process was accompanied by BBB alterations, depicted by impairment of tight and adherens junctions' proteins claudin-5 and β-catenin, and enhanced caveolae protein's expression, together with an earlier activation of myosin light chain kinase in pericytes, in the hippocampus.

Conclusions. These results reveal the alterations occurring in BBB endothelial and mural cells along brain metastasization, and the ability of BCC to express growth factors and migration-associated proteins, essential for their survival and invasiveness. Moreover, they reveal that brain metastasization of BC occurs earlier and more severely in hippocampus than in cerebellum. Supported by FCT (Portugal) and NKFIH/OTKA (Hungary).

MORPHOMETRIC ANALYSIS OF THE PATTERNS OF CALCANEAL FACETS FOR THE TALUS

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Key words: *calcaneus; facets for the talus; variations; morphometry*

Background. The literature describes different patterns of calcaneal facets for the talus in terms of whether some calcaneal facets are connected or separated from each other or completely absent.

Aim. The aim of this study was to establish the patterns of calcaneal facets for the talus, calculate their total size and analyse data considering the gender.

Material and Methods. Study involved 33 calcanei. The gender was established according to average parameter values standardly used for that purpose. The calcanei were photographed using a digital camera. The patterns of calcaneal facets were determined by comparing these photographs with photographs from the literature. ImageJ program was used to measure gender determination parameters and size of calcaneal facets.

Results and Discussion. Pattern 1 was the most commonly found in the study sample (51.52%), then pattern 2 (42.42%) and pattern 3 (6.06%). Among female bones the most frequent was pattern 1, while among male bones patterns 1 and 2 were present